

WHAT IS CLAIMED IS:

1. An imaging apparatus comprising:

a plate type fixed portion;

5 a spring portion formed by notching the inside of  
the fixed portion;

a movable portion supported in the fixed portion  
so as to be capable of slightly moving through the  
spring portion;

10 a micro-motion element which slightly moves the  
movable portion;

an imaging element provided on the movable  
portion;

15 a cooling element having a cooling surface thereof  
being in contact with a back side of the imaging  
element through a heat sink;

a highly thermal conductive member interposed in a  
gap between the fixed portion and the movable portion;  
and

20 a housing which accommodates therein the fixed  
portion, the movable portion, the micro-motion element,  
the imaging element, the cooling element and the highly  
thermal conductive member, and discharges heat  
conducted from a heat generating surface of the cooling  
element through the movable portion and the highly  
25 thermal conductive member.

2. The imaging apparatus according to claim 1,  
wherein the micro-motion element includes a

piezoelectric actuator.

3. The imaging apparatus according to claim 1, wherein the imaging element cools a CCD directly or indirectly by using the cooling element.

5           4. The imaging apparatus according to claim 1, wherein the highly thermal conductive member is a grease type or gel type.

          5. The imaging apparatus according to claim 1, wherein the highly thermal conductive member has a  
10       certain degree of viscosity, does not flow down from a gap between the fixed portion and the movable portion even when inclined, and is just pushed out or expanded from the gap between the fixed portion and the movable portion when the gap between the fixed portion and the  
15       movable portion is narrowed or widened by a slight movement of the movable member.

6. The imaging apparatus according to claim 1, wherein the housing filled with an inert gas.

          7. The imaging apparatus according to claim 1,  
20       wherein a grease consisting of a thermal conductive material is coated on a contact surface between the imaging element and the heat sink and a contact surface between the heat sink and the cooling element.

          8. An imaging apparatus comprising:  
25       a plate type fixed portion;  
          a spring portion formed by notching the inside of the fixed portion;

a movable portion supported in the fixed portion so as to be capable of slightly moving through the spring portion;

5 a micro-motion element which slightly moves the movable portion;

an imaging element provided on the movable portion;

10 a cooling element having a cooling surface thereof being contact with a back side of the imaging element through a heat sink;

a highly thermal conductive member interposed between the movable portion and the housing; and

15 a housing which accommodates therein the fixed portion, the movable portion, the micro-motion element, the imaging element, the cooling element and the highly thermal conductive member, and discharges heat conducted from a heat generating surface of the cooling element through the movable portion and the highly thermal conductive member.

20 9. The imaging apparatus according to claim 8, wherein the micro-motion element includes a piezoelectric actuator.

25 10. The imaging apparatus according to claim 8, wherein the imaging element cools a CCD directly or indirectly by using the cooling element.

11. The imaging apparatus according to claim 8, wherein the highly thermal conductive member is formed

into a sheet shape.

12. The imaging apparatus according to claim 8, wherein the highly thermal conductive member consists of a gel type and has appropriate elasticity.

5. 13. The imaging apparatus according to claim 8, wherein the highly thermal conductive member has a thickness and a flexibility which do not adversely affect a micro-motion operation of the movable portion.

14. An imaging apparatus according to claim 8, wherein the housing filled with an inert gas.

15. 15. The imaging apparatus according to claim 8, wherein a grease consisting of a thermal conductive material is coated on a contact surface between the imaging element and the heat sink and a contact surface between the heat sink and the cooling element.

16. An imaging apparatus comprising:

a plate type fixed portion;

a spring portion being formed by notching the inside of the fixed portion;

20 a movable portion which is supported in the fixed portion so as to be capable of slightly moving through the spring portion;

a micro-motion element which slightly moves the movable portion;

25 an imaging element provided on the movable portion;

a cooling element having a cooling surface thereof

being in contact with a back side of the imaging element through a heat sink;

5 a highly thermal conductive member which cuts across a gap between the movable portion and the fixed portion and connects the movable portion and the fixed portion with each other; and

10 a housing which accommodates therein the fixed portion, the movable portion, the micro-motion element, the imaging element, the cooling element and the highly thermal conductive member, and discharges heat conducted from a heat generating surface of the cooling element through the movable portion and the highly thermal conductive member.

15 17. The imaging apparatus according to claim 16, wherein the micro-motion element includes a piezoelectric actuator.

18. The imaging apparatus according to claim 16, wherein the imaging element cools a CCD directly or indirectly by using the cooling element.

20 19. The imaging apparatus according to claim 16, wherein the highly thermal conductive member is formed by an elastic body, and connects the fixed portion and the movable portion with each other without effecting a tensile force.

25 20. The imaging apparatus according to claim 16, wherein the highly thermal conductive member is formed into a corded shape or a zonal shape.

21. The imaging apparatus according to claim 16,  
wherein the housing filled with an inert gas.

22. The imaging apparatus according to claim 16,  
wherein a grease consisting of a thermal conductive  
5 material is coated to a contact surface between the  
imaging element and the heat sink and a contact surface  
between the heat sink and the cooling element.

23. An imaging apparatus comprising:

a plate type fixed portion;  
10 a spring portion being formed by notching the  
inside of the fixed portion;  
a movable portion which is supported in the fixed  
portion so as to be capable of slightly moving through  
the spring portion,

15 a micro-motion element which slightly moves the  
movable portion;

an imaging element provided on the movable  
portion;

20 a cooling element having a cooling surface thereof  
being in contact with a back side of the imaging  
element through a heat sink;

a first highly thermal conductive member  
interposed in a gap between the fixed portion and the  
movable portion;

25 a second highly thermal conductive member  
interposed in a gap between the movable portion and the  
housing; and

a housing which accommodates therein the fixed portion, the movable portion, the micro-motion element, the imaging element, the cooling element and the highly thermal conductive member, and discharges heat  
5 conducted from a heat generating surface of the cooling element through the movable portion and the first and second highly thermal conductive members.

24. An imaging apparatus comprising:

a plate type fixed portion;

10 a spring portion being formed by notching the inside of the fixed portion;

a movable portion which is supposed in the fixed portion so as to be capable of slightly moving through the spring portion,

15 a micro-motion element which slightly moves the movable portion;

an imaging element provided on the movable portion;

20 a cooling element having a cooling surface thereof being in contact with a back side of the imaging element through heat sink;

a first highly thermal conductive member interposed in a gap between the fixed portion and the movable portion;

25 a third highly thermal conductive member which cuts across a gap between the movable portion and the fixed portion and connects the movable portion and the

fixed portion with each other; and

5 a housing which accommodates therein the fixed portion, the movable portion, the micro-motion element, the imaging element, the cooling element and the highly thermal conductive members, and discharges heat conducted from a heat generating surface of the cooling element through the movable portion and the first and third highly thermal conductive members.

25. An imaging apparatus comprising:

10 a plate type fixed portion;

a spring portion being formed by notching the inside of the fixed portion;

15 a movable portion which is supported in the fixed portion so as to be capable of slightly moving through the spring portion,

a micro-motion element which slightly moves the movable portion;

an imaging element provided on the movable portion;

20 a cooling element having a cooling surface thereof being in contact with a back side of the imaging element through a heat sink;

25 a second highly thermal conductive member interposed in a gap between the movable portion and the fixed portion;

a third highly thermal conductive member which cuts across a gap between the movable portion and the



fixed portion and connects the movable portion and the fixed portion with each other; and

5 a housing which accommodates the fixed portion, the movable portion, the micro-motion element, the imaging element, the cooling element and the highly thermal conductive members, and discharges heat conducted from a heat generating surface of the cooling element through the movable portion and the second and third highly thermal conductive members.